



AN1541 APPLICATION NOTE

A MEDIUM POWER AMPLIFIER AT 1.8 GHz USING THE NPN Si START499 TRANSISTOR

Data at 1.8 GHz (3V, 200mA)

Gain = 15dB, P1dBout = 23dBm, NF = 3.3dB, RLin > 12dB, RLout > 7.7dB

START499 is a product of the START Family (ST Advanced Radio frequency Transistor). Housed in the ultra miniature 4-lead SOT-343 (SC-70) surface mount plastic package, it embeds the state of the art Silicon ST technology. The amplifier application circuit is designed for use with 30mils thickness FR-4 printed circuit board material. This amplifier is realized with a microstrip line as matching elements and a small number of surface-mount components. A single pin ($V_{cc}=3V$) for voltage supply is used. A $1\mu F$ bypass capacitor to filter the supply at the common V_{cc} node is also used. The transistor's base is connected to the power supply through a choke inductor (microstrip line TrL1) and the transistor's collector is connected to the voltage supply through a choke inductor (microstrip line TrL4).

Figure 1: Schematic Design

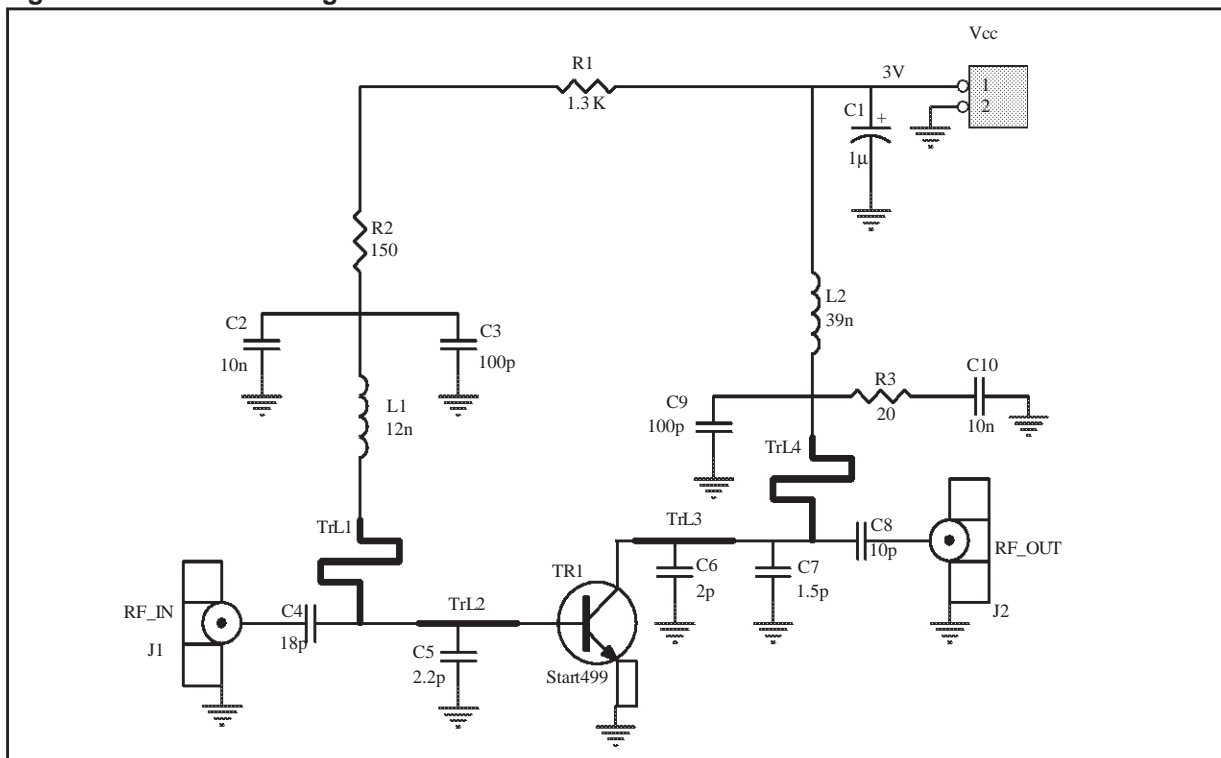


Figure 2: Demoboard Layout

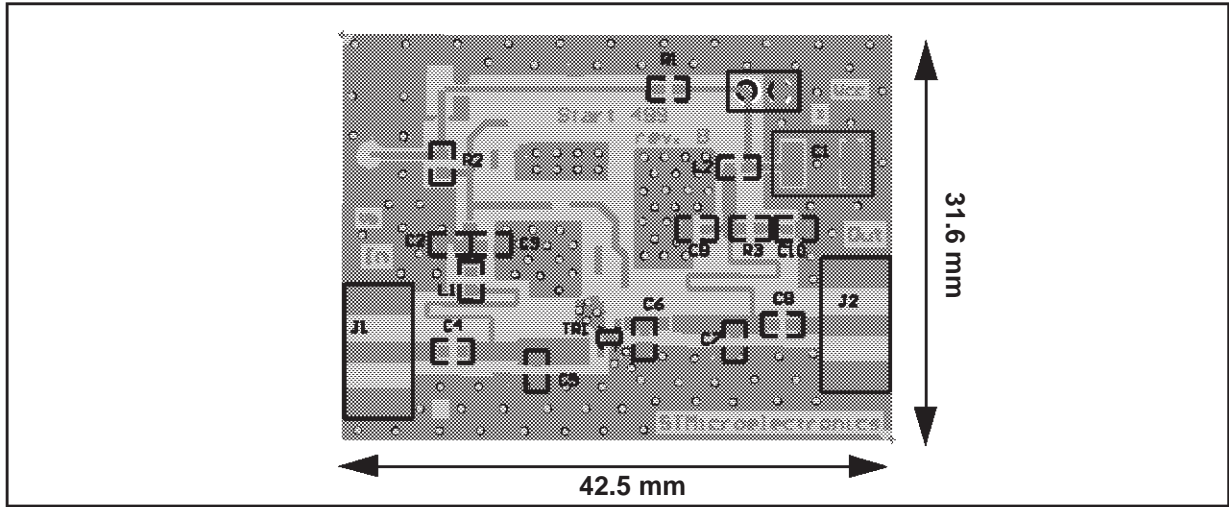
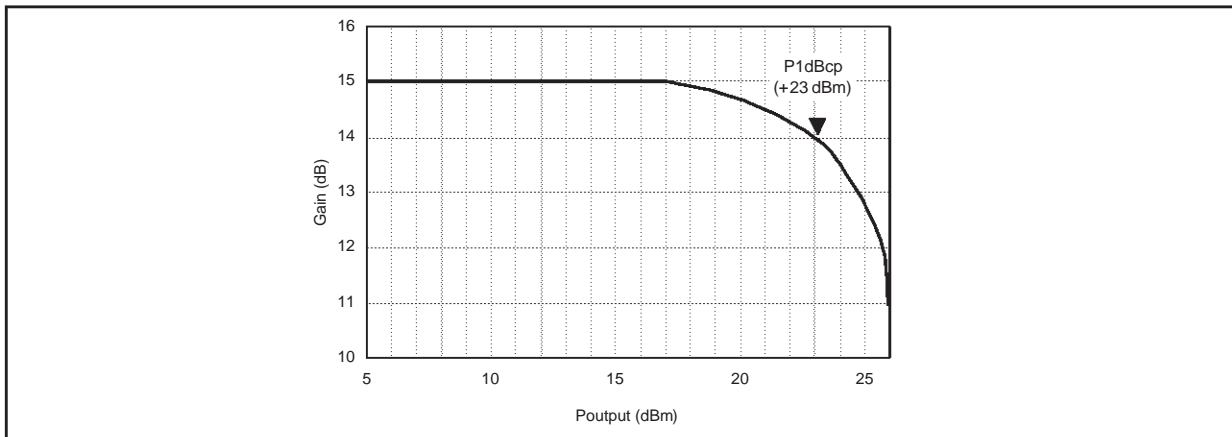


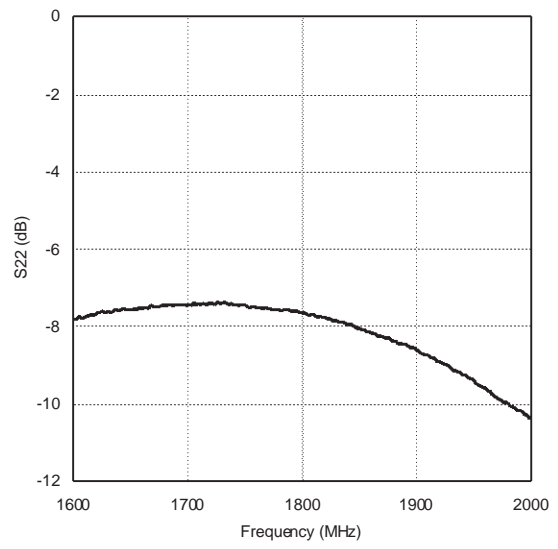
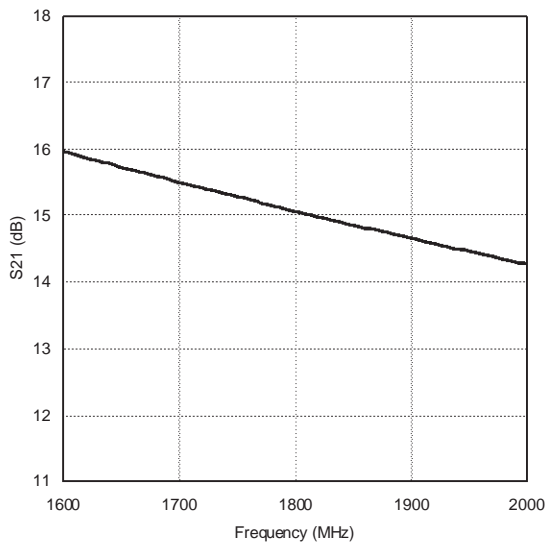
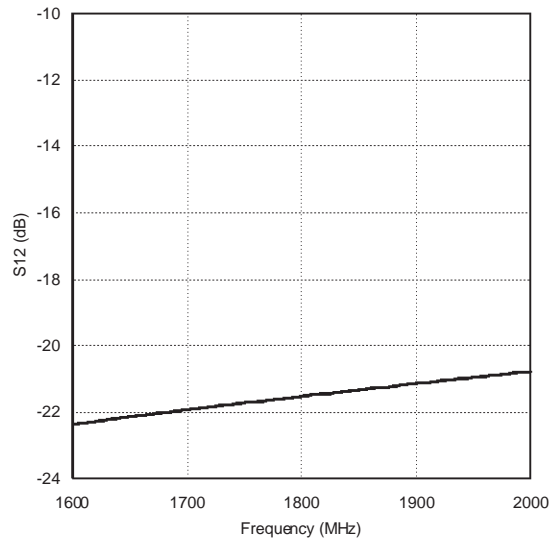
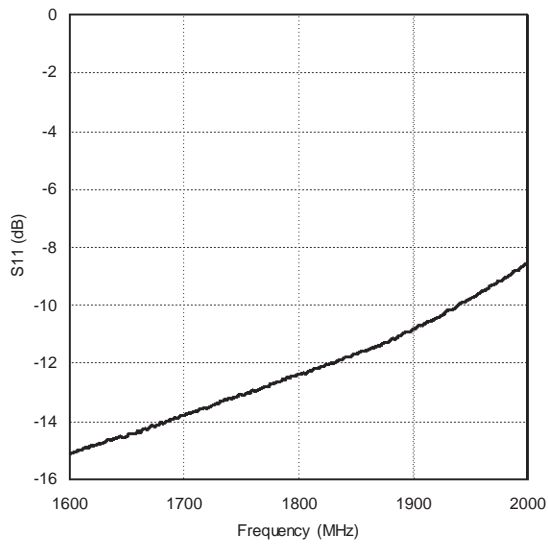
Table 1: Bill of Materials

Component	Value	Unit	Size	Comment
R1	1.3	kohm	0603	Various
R2	150	ohm	0603	Various
R3	20	ohm	0603	Various
C1	1	μF	A-Case	Various
C2, C10	10	nF	0603	Murata (series GRM39)
C3, C9	100	pF	0603	Murata (series GRM39)
C4	18	pF	0603	Murata (series GRM39)
C5	2.2	pF	0603	Murata (series GRM39)
C6	2	pF	0603	Murata (series GRM39)
C7	1.5	pF	0603	Murata (series GRM39)
C8	10	pF	0603	Murata (series GRM39)
L1	12	nH	0603	Murata (series LQP11A)
L2	39	nH	0603	Murata (series LQW1608A)
J3			DC Connector	Various
J1, J2	142-0701-881		SMA Connector	Johnson
TR1	Start499		SOT343	STMicroelectronics
Substrate	FR4		h = 30 mils	Various

Figure 3: Output power at 1dB compression point



S-Parameters



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